REMARKS/ARGUMENTS

The present invention teaches a method to form a magnetically pinned reference layer by allowing it to overlap an antiferromagnetic layer only at its edges, leaving most of the pinned layer with no contact to an antiferromagnetic layer, thereby removing the possibility of any shunting effects by the latter.

Reconsideration is requested of the rejection of claim 1 under 35 U.S.C. 102(b) as being anticipated by Horng et al. 2002/0174533 and Sato et al. 5992004.

Examiner bases this rejection on the following assertions (in italics):

(1) *Horng provides a layer of antiferromagnetic material such as layer 13 in fig. 6.* This is incorrect. Layer 13 in fig. 6 is a pinned layer (see [0021]). It is pinned by virtue of being part of a synthetic antiferromagnetic structure and is not itself an antiferromagnetic layer. It consists of a layer of cobalt iron which is not an antiferromagnetic material. The structure of which it is a part is referred to as a synthetic antiferromagnetic because it comprises two ferromagnetic layers that have been magnetized in opposite directions while separated by an AFM coupling layer.

(2) *AFM layer 13 has a central section with a first top surface and outer sections having second top surfaces (along sloping sidewall 66).* This is incorrect. As examiner has acknowledged, 66 is a sidewall, not a top surface. The top surface of layer 13 is its interface with layer 14.

(3) *depositing a layer of hard bias material a part of which contacts only the second top surfaces.* While hard bias material is ferromagnetic, a hard bias layer is unsuitable for use as a pinned reference layer (see below).

(4) *thereby forming the magnetically pinned reference layer.* This is incorrect for two reasons:

(i) Even if layer 13 were an AFM layer, exchange interaction with hard bias layer 71 is minimal so it would have virtually no effect on the magnetization already present in layer 71.

(ii) Hard bias layer 71 cannot serve as a reference layer for the device as its interaction with the free layer is only at the edges whereas a reference layer needs to couple with the free layer over most (preferably all) of its length.

Examiner relies on Sato to show that a hard bias layer is inherently ferromagnetic. While true, this is irrelevant (see above).

Reconsideration is requested of the rejection of claim 3 under 35 U.S.C. 103(a) as being unpatentable over Horng et al. (5,936,810) in view of Heim et al. (5,465,185).

Heim teaches that one of the outside layers of a synthetic ferromagnet can serve as a **pinned** layer, not as an antiferromagnetic layer (see assertion 1 above). Additionally, claim 3 is dependent on claim 1. Applicant believes that the anticipated allowance of claim 1(in light of the above arguments) will render claim 3 allowable.

In conclusion, examiner will have noticed that, in claim 1, we have amended "is in contact" to --makes contact—so as to emphasize that the claimed method requires that the pinned and antiferromagnetic layers touch one another.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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